

New Lithium-ion Polymer Battery for the Extravehicular Mobility Unit Suit

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Abstract

The Extravehicular Mobility Unit (EMU) suit currently has a silver-zinc battery that is 20.5 V and 45 Ah capacity. The EMU's portable life support system (PLSS) will draw power from the battery during the entire period of an EVA. Due to the disadvantages of using the silver-zinc battery in terms of cost and performance, a new high energy density battery is being developed for future use. The new battery (Lithium-ion battery or LIB) will consist of Li-ion polymer cells that will provide power to the EMU suit. The battery design consists of five 8 Ah cells in parallel to form a single module of 40 Ah and five such modules will be placed in series to give a 20.5 V, 40 Ah battery. Charging will be accomplished on the Shuttle or Station using the new LIB charger or the existing ALPS (Air Lock Power Supply) charger.

The LIB delivers a maximum of 3.8 A on the average, for seven continuous hours, at voltages ranging from 20.5 V to 16.0 V and it should be capable of supporting transient pulses during start up and once every hour to support PLSS fan and pump operation. Figure 1 shows the placement of the battery in the backpack area of the EMU suit. The battery and cells will undergo testing under different conditions to understand its performance and safety characteristics.

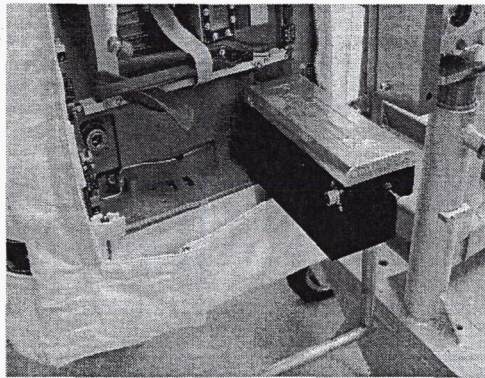


Figure 1. EMU Battery in the PLSS.